Vol. XI. MAY, 1905. No. 8

THE AGRICULTURAL STUDENT

5¢ PER COPY

-A-
MONTHLY MAGAZINE
DEVOTED TO
AGRICULTURAL
EDUCATION

50¢ PER YEAR

The Economy of a Cream Separator

"Cast not your pearls before swine" is good advice but rather lacks application. For the benefit of many dairy farmers it may well be changed to "Cast not your CREAM before swine—when butter is selling at 25 cents a pound." That's what you are doing every day of your life if you skim your cream by the old fashioned setting system. Maybe you think "Well, the hogs and calves get it so it isn't wasted." Now look here, Mr. Dairyman, cream is as valuable to you as pearls were to the ancient—you can't afford to "Cast it before swine." One cent's worth of oil meal mixed with the skim-milk is equal to a pound of butter as a food for stock. What you must have is a

United States Cream Separator

Then you won't waste any cream—you won't have to set your milk down cellar and your wife won't have to wash crocks and pans. All you need to do is let one of the children turn the separator crank for a few minutes, giving you the fresh warm skim milk to feed your young stock, and the rich smooth cream ready to ripen and churn. That sounds easy doesn't it—and it's as easy as it sounds when you have a U. S.

Down at the St. Louis world's Fair last summer every highest score on dairy butter was awarded to butter makers who use the U. S. Cream Separator—that's good solid proof of its unapproached superiority.

Lay this paper down now, and write us for our valuable booklet "The Dairy."

Vermont Farm Machine Co.

BELLOWS FALLS, VT.

A CAMPUS DRIVE

THE AGRICULTURAL STUDENT.

VOL. XI. OHIO STATE UNIVERSITY, COLUMBUS, MAY, 1905 No. 8

TERMS OF SUBSCRIPTION:

One Year	$0.50
One-half Year	.30
Single Copies	.05

While this magazine is published with the approval of the President of the University and the Officers of the College of Agriculture and Domestic Science, the editors are responsible for the statements in all unsigned articles.

Address all communications to the Business Manager, Agricultural Student, Columbus, Ohio.

Entered at the Post-Office, Columbus, Ohio, as second-class matter.

PUBLISHED MONTHLY BY
THE AGRICULTURAL STUDENT
PUBLISHING COMPANY.

FRED L. WEST ..... Editor
ALFRED VIVIAN ..... Advisory Editor
VERNON H. DAVIS ..... Business Manager

STAFF.

J. C. White
E. S. Poston
C. D. Hyatt
W. H. Palmer
L. E. Call
H. C. Ramsower

CONTENTS

EDITORIAL CHAT.

It has been stated that a common yield of potatoes in Saxony is 450 to 540 bushels per acre. This high average is obtained of course through most careful preparation of the land, and cultivation which overlooks no requirement while the potatoes are being grown. It is also stated that Prof. Girard in France has induced a number of growers to cooperate with him in raising the yields and that 231 of these in a very dry year obtained 450 bushels or more per acre. Not long ago a field of potatoes on Lord Roseberry's estate produced 860 bushels per acre. These facts make it apparent that there is considerable room for advance in our methods of growing potatoes in this country.

The breeding of seed corn is receiving much attention at the present time. It is very fortunate that such is the case, because of the influence that this may have upon the improvement of the crop. To show the magnitude of the operations of some who are thus engaged, it may be mentioned that Funk Bros. Company, Bloomington, Illinois, raised 7,000 acres of seed corn in 1904. They have been working in this line since 1892.

ELEMENTARY AGRICULTURE, AND THE COURSE OF STUDY.

SUPERINTENDENT A. B. GRAHAM.

The history of the world is but the story of the conflict between positives and negatives and between liberals and conservatives. Not only in nature are destructive forces combatting with constructive forces, but in society the same forces are directed against each other. The successions of culture epochs have to tell us but one thing—man's effort to rise above what he is; the worship of a living God has as its antecedents paganism and fetischism; government of the people has come up out of feudalism and the "divine" rights of kings; libraries have been burned and manuscripts destroyed; scientists have been regarded with suspicion, and those practicing certain arts were considered nothing more than wizzards. Such has been the price of the institutions and conveniences of today.

Such strife, destruction, and suspicion was largely brought about by ignorance, selfishness and an unwillingness of people to adjust themselves to new conditions. So many there are who from a fixed impression of "by gones" and from shortsightedness fail to see new conditions.

"New conditions teach new duties;
Time makes ancient good uncouth.
They must upward still and onward,
Who would keep abreast of truth."

New conditions in business, new conditions in society, new conditions in governments thrust new duties upon us in the home and in the school.

Very gradually new conditions have come to rural communities; a worn-out soil, insect pests, little timbered land, more weeds, fewer song and insect-eating birds. During the same period farm machinery has been wrought to a great degree of perfection, public roads have been laid out and improved, public school buildings have been erected, and rural mail delivery routes established. The perfecting of farm machinery has increased the number of acres that may be planted or sowed, cultivated, and harvested; good roads has enabled the farmer to market his products at almost any season of the year and at greater distances; the rural mail and the telephone gives him quick and direct communication with the business and social world.

The public school in Ohio was first established with a view to giving a limited knowledge of reading, writing and arithmetic. In seventy-five years orthography, English, grammar, geography, U. S. history and physiology have been added. With today's extensive text-books in each subject and with the teacher untrained or unassisted in selecting essentials from non-essentials, there is little wonder that the cry of "over-crowded program" goes up. It may be pretty safely said that there is not in our rural schools today a single text-book which was not written with the grades of the city and village in mind.

Should there not be such a course of study for our schools as will serve the best for acquiring knowledge, providing discipline and in assisting the child, his teacher, and his parents in determining what his vocation should be? Every branch of science is in some way represented in the environment of the child reared in the rural districts. The study of agriculture embraces nearly all of the natural sciences. Neither of the last statements warrants the use in element-

ary schools of the so-called nature work to that degree that the study of plant life should stand out clearly as botany nor that the study of animal life should be so systematically taken up that it might be mistaken for college zoology. If the pupil is aided in securing the names of objects and a few facts about them, there is little need for anxiety. If the habit of observing is formed in the elementary grades, the work in the high school becomes a great pleasure to the pupil and teacher. In the high school investigation and experimentation is added to observation; here classifications are made and relations discovered and studied.

During the elementary school period there must be formed those habits which shall dominate in the years following. As a rule within this period is acquired the reading habit, the dictionary habit, the memorizing habit, moral habits, the habit of observing, etc.

Here, then, if the pupil is to be taught the beauties of nature and the real worth of the farm he must begin to have impressed upon him these facts and the pleasures that come from conducting in a simple way some work that is related to some department of agriculture; here he must be assisted to read some of the most elementary texts on agriculture. It is far better that he should be reading something of the nature of Col. Parker's "On the Farm," and "Uncle Robert's Visit," than to be making a regular study from three to five recitations per week in the best text in elementary agriculture yet written for the elementary schools. In the schools of Springfield township no book in elementary agriculture has been adopted for use in the district school; no request has ever been made that such be done, but no less than half a dozen texts on agriculture and as many more on the beauties of nature are to be found in each library.

Some children have acquired more than others; some teachers have succeeded in leading and interesting more than others just as is expected in any school work. What may be done by the teacher depends more upon the intellectual qualification and teaching ability than the course of study. Not over an average of thirty or thirty-five minutes per week is quite enough time to take up within regular school hours for what might be termed elementary agriculture. Much of the nature work is incident to the reading or geography lesson. In no schools with which the writer has been connected either as teacher or superintendent has there been used on the average more time than that stated above, yet from the few things about which something was learned the first year there grew a fair acquaintance with the *common* field weeds and wild flowers, the *common* insect friends and foes, the *common* birds, the *common* forest trees, the *common* rocks and a few other *common* things. It might be said parenthetically that there have been found very few teachers whose time that should have been taken up in learning some simple facts about common things has been given to talking about some peculiar habit or characteristic that has taken a Thompson-Seton, or Long, or a Burroughs years to discover. Let us help the child along to the road of common characteristics of commn things; he may some day tell us about his discoveries. In the period referred to or at intermissions there was time during the winter for a few simple experiments in physics and chemistry; just enough to establish a fact. There was no long and tedious reasoning about phenomena. Probably the child was not ready for it. If he was ready to take up a reason, he

should be granted at least a few days to keep it on his mind. Let a child do some thinking for himself; just keep him growing.

The part of a course of study given to language, that is reading, spelling, and English should in no wise be weakened to make room for any work in elementary science. There can be no valid reason given for the use of science readers instead of the reader whose selections should possess literary merit. No time should be taken from what is needed in arithmetic; however, much that for a pupil from thirteen to fifteen or at any other age, is really useless should be thrown out and more time could be given to essentials whose problems should embrace more of those every-day calculations made upon the farm instead of so many dollar-and-cent problems used by the commission merchant or banker.

Geography, physiology and United States history, when the contents of each in the text-books of today are considered claim more time for intensive study than they are justly entitled to on the program or in the course of study for the average country school. Most advanced as well as elementary geographies of today not only contain the essentials for the grades in which the subject is to be taught but furnish supplementary material as well. Many of the physiologies used in Ohio rural schools would make very fair high school texts. The essential of United States history can be well taught from a small text of two hundred and fifty or three hundred pages and the real interest in U. S. history may be so aroused from the use in class of such a text that more extensive ones are eagerly sought.

There is much time wasted in half teaching a subject treated for the child in a text containing unnecessary material; there is also loss of time and interest in attempting to teach everything from a text in the hand of a pupil. Drawing and elementary science are best taught by direct instruction from the teacher. Such work prepares the pupil to use a text at the proper time. Such work in simple tests, experiments, and observations will in the last few years of the elementary course amply prepare any pupil who shows some talent for agricultural work to make an intensive study from a text in the high school and in the more carefully made experiments at his home.

The fact that there are from 4,000 to 8,000 fewer children enumerated each year in the rural schools of Ohio is forcing a serious consideration of a course of study for rural schools such as will add to the three R's studies and exercises most needed in arousing in the child an interest in literature, general and special, the sciences and the arts which shall have the most to do with the life which he shall live.

Today is the time for every township superintendent, rural school teacher and patron interested in improving the rural schools to begin an educational campaign to create interest in the necessity for courses of study and preparation of teachers for rural schools where the life of the people, the beauties of the country and industries of the farm may be given consideration in keeping with their importance. Resistance will be met and opposition encountered but these will prove but a balance giving stability and permanence to each progressive step.

THE STORING OF FRUIT.

LELAND E. CALL.

The past century has been a period of remarkable agricultural progress, but in no line has the development been more rapid than in the fruit industry. Outside of the wine producing regions of the old world little fruit was grown one hundred years ago. In 1871 there were not more than a half dozen fruit stands in London ,now the greatest fruit market in the world. The soil and climate was practically the same then as now. Many choice varieties had been developed, some of which are even yet our favorites, but two important things were lacking without which a large successful fruit industry could never be caried on; first, regular and rapid transportation; second, practical and concenient cold storage. The invention of the steamship and the railroad successfully solved the transportation question and furnished such a stimulus to the fruit industry that it resulted in disastrous over-production in some sections. Large orchards, vineyards, and small-fruit plantations were planted further from the market than the fruit could be transported. This was particularly true in the south, where large crops of early strawberries, blackberries, raspberries, peaches and plums were grown for the northern market. A fine quality of fruit was produced, but it was impossible to hold it any length of time in good condition, and the result was that many car load of fruit perished before it reached the consumer. The same was true in the north, crops could be kept but a few days; at the beginning and end of the season remunerative prices were received, but in the flush of the season the market was temporarilly flooded, resulting in heavy losses to the grower. Apples lay rotting on the ground in the summer and the fall, while by midwinter they could not be secured at any price. Canning and drying somewhat relieved the situation, but the introduction of the cold storage plant for the storing of fruit has revolutionized the business and is now regarded as one of the essentials of the fruit trade.

The practice of refrigeration is old, the Greeks and Romans stored ice and snow in pits and used it for cooling drinks and foods. In 1607 mixtures were frozen with salt and ice. In 1799 the ice trade began to develop in this country and in 1880 the short ice crop in New England gave impetus to the production of artificial ice. In 1856 Benjamin M. Nyce, of Indiana, developed and patented the first ice storage house that was successful. In this house ice was stored upon a floor of sheet iron which formed the ceiling of the room to be cooled. The water from the melting ice was carried off by pipes. Calcium chloride was used to take up the moisture in the storage room and a windmill was used to run a ventilating fan, but the fan was soon discarded as unnecessary. In 1865 the Nyce storage house of Cleveland held a temperature below 34 degrees from April to August. In the winter of 1870-71, 4000 bushels of apples stored in this house yielded a profit of $7200. Apples and late pears were successfully stored, but summer fruits lost their flavor and decayed in a short time.

At the present time ice refrigeration has been abandoned on a large scale and mechanical refrigeration has taken its place. A machine for producing cold by evaporating water in a vacuum is said to have been made by Dr. Cullen, of Scotland, in 1755; later many other ma-

chines were made with more or less success. In 1875 Prof. Carl Linde, of the University of Munich, invented the first ammonia compression machine which is the basis of our leading refrigerators.

Mechanical refrigeration is based upon the principles that the expansion of all substances in whatever state is accompanied by the absorption of heat, and it is only necessary that the object to be chilled be near the expanding material. The principal materials used at the present time for the regrigeration of large chambers are anhydrous ammonia and carbon anhydride. These are reduced in volume by compression in cylinders, when admitted to pipes in the building to be cooled,the gases expand and extract the heat from the room, after passing through a system of pipes the gas in again condensed in cylinders to carry off the heat given up by the gas when compressed. Another method is to pass the pipes filled with expanding gas through tanks of brine circulating the cooled brine through the refrigerator room.

About 1890 the first mechanical storage houses were used for storing fruit. The construction of these houses rapidly increased and in 1901 it was estimated that there were 600 houses in use with a capacity of 50,000,000 cubic feet. Few summer fruits are stored and they are held but a few days as most of them rapidly deteriorate in flavor although holding their form and color. Peaches are stored only for short periods for a rise in price or to bridge over periods between crops in different sections of the country. The later varieties of pears are extensively stored, there were 40,000 barrels of Bartletts in New York City at one time. Pears for storage should be picked before they are mature, but not until the fruit has attained nearly full size. They should be held at nearly 32° F. as they keep longer, retain color and flavor better and stand up longer when removed from storage. If ripening is desired the temperature may be allowed to become higher. They should be stored in packages of about 50 pounds, in which case there is no need of ventilation with the boxes, and less danger of wilting. The rapidity of decay after removing the fruit depends upon the nature of the variety, maturity and the temperature of the air into which the fruit is taken.

Apples are more extensively stored than any other fruit for two chief reasons: First, apples are eaten and relished at all times, while we tire of other fruits if they are constantly before us; second, apples retain their flavor and appearance under refrigerator conditions longer than any other fruit. On December 1, 1900, there were 1,225,000 barrels of apples in cold storage, and 792,000 barrels in common storage. Thus far dealers utilized cold storage to a larger extent than the grower, but when the grower has a large crop of choice fruit and handles it properly it may often be stored with profit. The cost of storing averages 40 cents per barrel up to May 1, and it is rarely that apples do not advance in price more than this. Apples should be placed in storage as soon after picking as possible and especial care should be given to the packing. So important is this that many dealers refuse to purchase apples for cold storage not packed by their own packers, or by competent packers whom they know.

Co-operative or individual cold storage house have been suggested, but the cost is so large, and so difficult is it to secure competent employes that its economy is uncertain, unless they can be run in connection with a creamery

or other establishment. For the individual grower the ice refrigerator house or the house cooled by ventilation are the most satisfactory, and perhaps the latter is the better, at least it is the most economical. The requirements for such a house are: First, thorough insulation against outside changes of temperature; second, good ventilation; third, careful and constant attention. Whether you use mechanical refrigeration, ice refrigeration, or cooling by ventilation, success can not be hoped for except by using good fruit, handling and packing the fruit properly, and keeping the temperature of the storage house within reasonable control.

THE POLAND-CHINA HOG.

C. D. HYATT.

The Poland China is truly an American hog, having been originated in the valley of the Miami in southwestern Ohio something over a half century ago, by the blending of several distinct breeds, the object being to produce a hog of great fattening qualities and early maturity as well as size. This is the popular breed today among farmers of the West, and by this we mean Ohio, Indiana, Illinois, Iowa and parts of Kansas, Nebraska and Missouri, and its advocates claim that its quiet disposition makes it the best breed in the world for converting corn into pork and lard. It combines the good qualities of both the large and the small breeds. Coburn speaks of this breed as being "the best pork-making machine known; in fact, nearer what the farmers of the West need than any other single breed in existence." The Poland Chinas are not confined wholly to the United States, as we have reports of them being shipped to Germany, where they are bred pure and are doing well. Still we find that they are better suited to some sections of the country than others. James Long says: "The Berkshire breed is probably destined to supersede all others in the northern latitudes of the United States; but for the intermediate portion or between parallels 38° and 42° north latitude the Poland China is destined to hold the favorable opinion of western farmers."

One great redeeming feature of this breed is their general contentment with surroundings. Notice them in the show ring at our fairs how quiet and easy they are; or in the pens awaiting the ring; hundreds of people passing and all making as much noise as they conveniently can. Slapped over the ears with canes, punched in the ribs with umbrellas our much-enduring hog must get up for the hundreth time and let some curious, disinterested person see how big he is. Strange people, strange quarters, hot weather, hosts of flies, and yet the Poland China seems to be contended with his lot, for he is not quarrelsome, he eats his feed and rests the best he can.

The sows make the best of mothers; they are good milkers, good feeders and careful with the young pigs .Some sows, we have noticed, when lying down will get down on their front quarters first and throw themselves the remainder of the way, and it is a speculation as to whether all of the little pigs will get out of the way or not. On the other hand, we have noticed how slow and easy the Poland China sow moves around among the little fellows, giving them plenty of time to get out of the way, and how she tries to keep from

stepping on them, or lying on them. Someone may say that this is true only of certain families; but it isn't. It is a breed characteristic.

The Poland China will, we believe, reach 180 or 200 pounds quicker than any other breed of hog. It is said that they mature so rapidly, as to interfere with sufficiently large growth, but this does not seem to be a very serious objection, for with this rapid growth we get plenty of scale, evenness in the relative size of shoulder and ham, good top and bottom lines and short legs. The full-grown Poland China will average about 550 or 600 pounds; we couldn't call that a very small hog. And as the tendency now is to market them as pigs, weighing anywhere from 150 to 225 pounds, their early maturity is rather a benefit than an objection.

In looking over the general run of articles written in regard to the prolificacy of this breed it is apparent that the breed as a whole varies; that in certain families litters of from 8 to 12 pigs are the rule, while in others probably the average will not be over 6 or 7, and the breeders of the latter class, which represents the minority, we are happy to say, decry the Poland China as being unprolific and altogether a back number in this day and age. Such statements, we say, are not uncommon. While on the other hand those breeders who, in selecting their breeding stock each year, have held that prolificacy is next after conformation in importance, generally have no kick coming. Mr. Ed. Klever, a prominent Poland China breeder of Ohio, says that his sows will produce regularly from 6 to 12 sound, healthy pigs at a litter.

With so many contradictory statements coming up in our newspapers and elsewhere every now and then, it would seem that there is no definite way of getting at the facts of this question of prolificacy, as the friends of the Poland China will place him above any other breed in this respect, while his enemies cannot say one good word for him. Let us turn a moment to the herd book. Here we find registered the best blood in the country, types the most truly representative of the Poland China hog. As the result of an argument held some time ago we looked through the latest herd books of several of the different breeds of swine. We found that the average litter for the Poland China was a fraction less than 8; Berkshire, a fraction over 8 and Duroc-Jersey between 9 and 10. We have had a little experience with several different families of Poland Chinas and Berkshires in this state and we found that the average of all the litters for the former was about 8, thus agreeing with the herd book records. In a few cases where the sows were young and had their first litters the number did not exceed 6 or 7, but in no case were they "twins or triplets," and these same sows often turned out to be the best of producers after their first litters.

In summing it up we would like to say, don't be afraid to breed the Poland Chinas. Prof. Plumb has said that the trouble is with the breeder and feeder and not with the breed . And we know that they are specially adapted to our conditions, and if selections and matings are properly carried this breed will continue to hold the same favorable opinion among breeders in the future that it has so justly held in the past.

THE PLUM CURCULIO.

JAMES E. McCLINTOCK.

This insect is, as the name would imply, an enemy of the plum; but by no means of the plum alone. It attacks either for purposes of propagation or for food, the nectarine, plum, apricot, peach, cherry, apple, pear and quince, preferring them in the order named. It is the insect which causes the wormy cherries and peaches in which the insect remains until fruit is mature.

It is a small (1-5 to 2-5 inches long), roughened, warty, brownish beetle, belonging to the family known as snout beetles (*Curculionidae.*) It may be distinguished from all other snout beetles by having an elongated hump, resembling a piece of black sealing-wax, on the middle of each wing cover. Behind these humps is a clay-yellowish band with more or less white in its middle.

In this hard, shelly, adult or beetle stage the insect passes the winter, sheltering itself under the shingles of houses, under old bark of both forest and orchard trees, under logs and rubbish of all kinds. Then as spring opens it awakens from its stupor and comes forth from its hiding place, about the time blossoms open. If it has slept through the winter in the forest it instinctively searches the nearest orchard and feeds sparingly upon the young and tender foliage.

After the fruit has become well set "Mrs. Turk" alights upon it and with the small jaws located at the end of her well-developed snout, she makes a small incision just through the skin of the fruit. She then runs her snout under the skin, 1-16 of an inch deep, and moves it back and forth until the cavity is large enough to receive the egg which it is to retain. Then turning her body she deposits an egg in the cavity. Immediately resuming her former position she pushes the egg to the end of the passage by means of her snout and afterwards deliberately cuts the characteristic crescent in front of the hole so as to undermine the egg and leave it in a sort of flap. Cutting the crescent is evidently to deaden the flap and thereby prevent the growing fruit from crushing her egg. The entire operation requires about 5 minutes.

This egg, which is a pearly-white oval, will, if the weather be warm and genial, hatch in four or five days; but if it be cold and unpleasant the hatching will not occur for a week or ten days.

The soft, little, footless, horny-headed grub which hatches from the egg, immediately begins to feed upon the pulp of the fruit and eating a tortuous, winding, way to the pit of the fruit, if it be a stone fruit. While this little varlet is making his living it is causing a great disturbance in the natural growth of the fruit, which soon sickens, loses its hold on the twig and falls prematurely to the ground. Then within a week or two the grub forsakes the fruit which it has destroyed, having lived in the fruit from three to five weeks, and burrows from four to six inches into the ground.

Mary Treat nicely describes it at this stage as "of a glassy yellowish-white color, though it usually partakes of the color of the fruit flesh on which it was feeding. It is about 2-5 of an inch long, with the head light brown; there is a lighter line running along each side of its body, with a row of minute black bristles below and a less distinct one above it, while the stomach is rust-red or blackish."

In the ground it forms a smooth oval cavity, by turning round and round, in which it pupates. In this earthen chamber the pupa lives a life of about three

weeks, when it takes on the form of the adult curculio, and after resting long enough for its different parts to harden again works its way toward daylight. Here it takes flight, finds a resting place for the winter and repeats the work of depredation the following year.

It is often claimed that the egg fails to hatch or that the young larvæ perishes within a few days in any of the pomaceous fruits, i. e., apple, pear, etc. But it seems to mature quite well, in some cases, at least in the apple as the following will show.

Mr. N. K. Fluke, of Davenport, Ia., says he caught over 4000 Curculios from 60 Duchess apple trees and that 19-20 of these were plum curculios and only 1-20 the apple curculios.

Furthermore, he sent a basket of 56 immature Duchess apples in July to C. P. Gillette. Iowa Experiment Station entomologist, all of which he considered stung by the curculio. Gillette counted 180 sting scars and placed the apples on moist earth in a box covered with cheese cloth and on August 21 examined them, finding 11 fully matured plum curculios, 49 immature ones and 21 pupa. Gillette reports: "This is fully as many, I think, as would often be reared from an equal number of punctured plums."

The scar on the apple is not of the characteristic crescent shape.

The San Jose scale is thoroughly controlled by the lime, sulphur and salt wash, and kerosene emulsion when *thoroughly* applied. The peach tree borer, perishes by the cutting-out method and the brown rot comes to a halt when Bordeaux is judiciously and thoroughly applied. But the curculio baffles all contrivances except the tedious jarring method.

A very conservative estimate of the injury done annually to the peach and plum crop of some states is 25 per cent. of the entire crop.

In orchards where perfectly clean cultivation is practical the pests have been trapped in small piles of litter such as corn cobs, sticks and the like, which could be easily removed and the insects harboring there-in killed.

The effects of Paris green and other poisonous insecticides upon the insect seem somewhat in dispute. Weed, in his book of "Insects and Insecticides," states "that Paris green is a sufficient protection" against the curculio. And the same is stated in Ohio Bulletin No. 8, New Series. But most reports would lead one to think the authors of such statements experimented only on paper or in orchards comparatively free from the curculio. The curculio does, however, feed upon the young foliage before the fruit sets and can to some extent be poisoned. But by far the most effective way of combating the insect yet known is the jarring method, which consists of giving the tree and larger limbs a sudden jar by striking them with a mallet or with the end of a pole, taking care that they are well padded to prevent bruising or injuring the bark. Having previously placed beneath the tree a sheet stretched upon some light, portable frame, from which the insects may be easily gathered. Some use two frames with a notch at the middle of one side. These are placed on either side of the tree so that the tree is in the hole made by the notches. A very convenient device is a sort of an inverted large umbrella shaped frame covered with cloth with a can containing kerosene at the apex. The frame is on a wheel and may be wheeled under the tree, the tree passing through a slot extending nearly to the apex and covered by a flap.

This method is possible, since the cur-

culio, like many beetles, when alarmed, lose their hold, fold up their legs, drop and "play 'possum."

This operation is more successful if carried out in the morning while the muscles of the insect are cold and stiff, for in the warmer part of the day they are likely to fly away.

IMPROVEMENT OF FARM MACHINERY.

GEORGE A. CRABB.

One of the most prominent features in the development of American Agriculture is the great number of improvements that have taken place in the methods and machines. They have reduced the amount of human labor required to produce a given quantity of crops and to cultivate given areas of land and are largely responsible for the changing of local markets into world markets for cereals, cotton, animal and dairy products.

The first settlers that came to this country settled at Jamestown, Va. They had very few implements in the way of farming tools. In fact their entire lot consisted of a hoe, an ax and a mattock and with this equipment they cleared the land and raised their first crops.

In taking up the study of farm machinery one of the most important tools and one which has undergone more study and experimenting is the plow. In 1637 there were only thirty seven plows in Massachusetts Bay Colony and for twelve years after the landing of the Pilgrims there were no plows at all on the farms and the soil was dug up with rude hoes and mattocks. After plows came into use it was the custom for years for a person owning a plow to do all of the plowing in the community, and "towns" as they were called, then kept these plows in repair and paid bounties to those persons owning them.

These old plows were certainly picturesque from the descriptions of them and their work. What was known as the "old colony plow" was ten feet long and had a four-foot landside and the furrows it left stood up like the ribs of a lean horse. It required eight or ten oxen to pull it, a man to ride the beam and another to follow along with a hoe and dig up the places it missed.

The first patent taken out was for a cast iron plow. In this the mould board share and landside was all in one piece, but this was not popular and was not accepted by the farmers because as they said it poisoned the soil and made the weeds grow.

Thomas Jefferson wrote a treatise on the plow in 1798 in which he gave the results of his careful study of the curvature of the mould board so as to lessen friction and yet turn a good furrow and it is said to have taken forty-five years of inventive genius and observations by the farmers to arrive at a conclusion of the best shape for a plow.

The Oliver Chilled plow of 1870 was one of the first suitable plows made and was later followed by sulky plows, gang plows, plows and harrows combined, side hill plows, vineyard plows, beet plows, disc plows and lastly the steam gang plow combined with seeder and harrow.

As a rsult of the improvement of the plow, speaking only of the latest ones, the cost of production of wheat was reduced from four cents per bushel to one cent. Time required of human labor for fitting soil to raise a bushel of wheat was reduced from thirty-two and eight-tenths minutes to two and two-tenths minutes and animal labor was reduced

from fifty-seven minutes to one and one-half minutes.

Another line of implements which has taken long years of difficult work to perfect is the binders, including the reaping machines. The farmers no longer have to cut their grain with the sickel or cradle and rake it and bind it by hand and then thresh it out with flails, but can do the whole operation of cutting, threshing and sacking of grain at one time. Nor do they have to cut the grass with a scythe, rake it by hand, load and unload it by hand, but have machinery to cut, rake and load and unload without the amount of manual labor that was once necessary.

The old method of reaping grain by hand was too slow for America and in 1833 Hussey, of Cincinnati, Ohio, patented the first sucucessful reaper. This machine was introduced into New York and Illinois in 1834; into Missouri in 1835 and into Pennsylvania in 1837.

This machine was followed by McCormick's reaper in 1834, but neither was popular until 1845 when one hundred and fifty were built at Cincinnati and the next year three hundred more were built.

A general trial of all reapers was given at Geneva in 1852 and another at the French exposition in 1855. In the latter trial one English, one French and one American machine took part and the results were greatly in favor of the American machine.

In all of the machines built up to this time the grain was left on the ground unbound but in 1856 Yost secured a patent for a cord binder which was operated by an attendant. This was followed by a number of other binders some of which bound the grain with cord, some with wire and one bound with grass.

The success of the self binders depended upon the knotter of which only two successful ones were ever built. One by Walter A. Wood and another by Appleby and known as the Appleby binder.

The self binder was followed by the headers, a machine that only cuts the heads of the grain and this was followed by a machine that cuts threshes and sacks the gain, used either with horses or traction engine and is pushed instead of pulled. When horses are used it requires from thirty to thirty-six, cutting from sixty to one hundred and twenty-five acres or from 1700 to 3000 bushels per day.

The mower was developed right along with the reaper; in fact they were one machine for a number of years and Hussey's machine is the real foundation of the mower.

The first practical mower was built by William Ketcham and was later followed in 1856 by one built by Lewis Miller. This machine contained all of the principles that exist in the successful machines of today and our present machine is only a development and perfecting of this type.

The corn harvester is another machine which has played a very important part, especially in the corn belt. This machine needs no description for its improvements have all taken place in the last few years and have been witnessed by all.

The old method of cutting corn with the knife was followed by the sled cutter and this was followed by the binder and the binder is now being replaced by the machines which both cut and shock the corn.

Another very important thing has been the development in the methods of planting corn. At first corn was dropped by hand and covered with a hoe. Later ground was furrowed out, corn dropped by hand and covered by

a light single shovel plow called a "skip jack." This was replaced by a double shovel plow called a "straddle buck." In this method a shovel ran on either side of the furrow and covered the corn. These methods were followed by the spud or jobber and later by single one-horse drill that planted one row at a time.

The single drill was followed by the two-horse planter which planted two rows at a time and either drills the corn or checks it.

The harrow has been improved to a vast extent. The first harrow used in this country consisted of only a brush dragged over the ground. This was followed by the wooden frame with wooden teeth; later by one with iron teeth and later by a steel framed one with steel pointed teeth. Various types have been developed since then, the disc harrow, smoothing harrow and various forms of pulverizers.

Seeding is not only done more rapidly and easier by the improved grain drills and seeders, but the grain is sown much evener and is put in the ground to a more uniform depth.

Threshing is also done easier and better and with a less expenditure of time and labor than formerly. The first threshing machine was patented by Pitt in 1855. This was followed later by a machine with straw stacker attached and later by the self-feeding and band cutting machine which threshes, weighs and sacks the grain, and stacks the straw by wind.

The list of farming implements is entirely too large to take each class up in detail and I have only attempted to tell of the most important, but will give a list of some of the remaining classes.

All of the smaller implements were formerly made at home and to a great extent were made of wood but are now made in factories. Other larger implements that are common are the potato planter and digger, tobacco planter, hayrake, tedder, loader and forks for unloading and mowing, corn huskers, feed and ensilage cutters, manure spreaders, all of the different types of farm wagons and vehicles and many others of which we have neither time nor room to mention.

As to the rank of this country in the manufacture of farming implements and machines it excels in both quality and numbers.

Everywhere in this country mechanical contrivances have largely supplanted human labor in many respects or has improved application of labor and increased the products of agriculture, reducing the cost of production and increasing the farmers income and has made his life an easier one than it was before.

Changes in the Department of Agriculture at Ohio State University.

At the April meeting of the Board of Trustees the Department of Agriculture was abolished and four new departments were created from it: The Department of Agronomy, in charge of Associate Professor McCall; Department of Animal Husbandry, in charge of Professor Plumb; Department of Dairying, in charge of Professor Decker, and the Department of Rural Economics, in charge of Professor Price.

The rapid growth of the Department of Agriculture in the last few years had made a division of the work imperative for the greatest efficiency of all concerned, and the action of the Board of Trustees was the unanimous recommendation of those who formerly composed the Department of Agriculture.

SUGGESTIONS FOR THE NEGLECTED SIDE OF THE FARMER.

NORMAN E. SHAW.

As the majority of argricultural students will eventually return to the farm, it may be well to consider one side of our chosen vocation which is usually neglected by the average farmer.

With the great beneficial changes which are taking place in agricultural methods as a result of scientific investigation and educational work, a new dignity has been given to our occupation. In the light of present day knowledge of agriculture, more will be expected of the man from the farm. It is necessary, then, that he make himself worthy of the new social esteem which is now accorded to his calling.

No one is to blame but the farmer himself for his name being as a synonymous term for all that is uncouth, ungainly and green. The trouble does not lie with the occupation. As we are learning then those principles which enable us to improve our condition financially, let us not fall behind in cultivating that side of our life which will give to our calling that social prominence which other professions enjoy.

In the first place we should not narrow ourselves to that one particular phase of agriculture in which we are interested, but be so informed that we may talk intelligently with men interested in other lines. Also keep in such touch with current topics that in conversation with busines and professional men, they will not feel constrained to ask foolish questions about crops. It is right here that the farmer, being the financial equal of men in other professions, usually falls short. He is not so able to express himself; does not have that smooth flow of words which seems to come so easily from the mouth of the city man. Again, it is not entirely because he is a farmer, but because he has neglected this part of his training. His advantages and opportunities are now of such a nature that there is no longer any excuse for this failing. For mere trifles the best of periodicals may be had, and through them he is able to keep in close touch with progress and the doings of his fellows.

In the matter of dress there is room for great improvement. Of course in farm work, comfort above all things is desired; but when he is off the farm, and mingles with other men in town, or at public gatherings, or during leisure periods about his home, he should be as well dressed as the occasions demands and his means allow. With his broad shoulders and that element of strength about him, he is as well fitted to wear as good clothes as any man. It is very easy to be careless in these matters, yet nothing will help more in raising the dignity of our calling. If he is careful of his personal appearance he will not stand out so differently from other men, and make the name of farmer a subject for jest and scorn.

Then let us make our homes attractive. Nothing is more pleasing and gratifying than a country home made beautiful. It stands alone a thing of beauty and does not share its attractiveness in a row with many others of similar design. It is true that we may be somewhat isolated, but we have the more opportunity to make our surroundings atractive. Choice trees, shrubs and flowers can be grouped about our houses in true artistic beauty, and with it all carry an air of convenience and comfort. In our homes let us cultivate all those little niceties of speech and maner which make life pleasant and refined. Be care-

ful about our daily table etiquette, so that we may be at ease in any company, and friends and strangers partaking of our hospitality will feel that they are in a home of refinement, the equal of those found in town or anywhere.

While in college here let us, as we are learning the technical things necessary to our success, also keep in mind and cultivate those qualities which will broaden our view, give more pleasure to our lives, and raise our calling to such a dignity, that it will stand socially as prominent as that of any other. It has long been regarded the most honorable and independent, and needs only to be raised to a higher social standard in order to take its place at the very top.

Thus with the object of ever advancing the cause of agriculture, let us make of ourselves men, who will stand for the highest ideals in our profession, and who will be the equal in breeding, manners and intellect of those in any other profession or business. That will be a man who can mingle anywhere, and who will not stand distinctly alone in any gathering except for that healthful complexion and look which only a farm can give.

THE SEEDING OF ALFALFA.

F. D. HECKATHORN.

Alfalfa has been cultivated and raised in the United States for almost one hundred years. It was first introduced into New York State in 1820, but it did not do well. In 1854 it was introduced from Chili into California and it has spread rapidly eastward until it is now raised to a more or less extent as a forage crop in every part of the United States.

Its extensive cultivation and distribution proves that the best feeders have realized its value as a food for live stock and especially young and growing animals.

Many farmers find it very difficult to secure a stand of alfalfa which would in time produce a paying crop. This is due to the fact that there is not sufficient attention given to the preparation of the ground and the selection and sowing of the seed.

In order to secure a good stand, every phase relative to the sowing of the seed should receive careful attention and should be rightly performed. The seed should be carefully selected, because very often much of the seed sown is sterile and of course does not sprout. The seed should be a bright golden-yellow, as the darker seed is older and does not sprout as well as fresh seed. In fact, if the seeds are dark or brown, it is a very good indication that they are dead. The seeds can be tested by placing some of them between two flannel cloths and laying them on a plate. Then they should be merely moistened with water and covered with another plate. The dishes with the seed should be placed in a warm room of uniform temperature. As the seeds sprout they should be removed and a record kept as to the number which do not sprout. At least 70 or 75% of the seed should sprout in order to be desirable for sowing.

The preparation of the soil for sowing is no less important than the selection of the seed. A field should be selected which is intended for the raising of alfalfa for several years, because these plants do not do their best the first year, but only after they have secured a good stand. As alfalfa can be grown for at least twenty years on the

same field it is certainly essential that the ground should be carefully prepared and the seeding be done right.

If possible the land selected for the seed-bed should be naturally adapted for the production of alfalfa. It does best in a soil which has a light loam or sand and gravel as a surface soil and a sub-soil which is deep, loose and not impenetrable to the long roots which the plant sends out.

Joseph E. Wing says "that a good seed-bed for alfalfa is a good stiff clay soil which is covered with a good vegetable food as humus or stable manure. If the manure is that which has been made from alfalfa it is better because it will contain the kind of bacteria which are peculiarly adapted to growing alfalfa."

This gives rise to the subject of the inoculation of the soil which is receiving so much attention at the present time. It is a well-known fact that leguminous plants such as alfalfa need much nitrogen for their growth, and that without the proper supply of nitrogen they will not make satisfactory progress.

It has been discovered that each legume has bacteria peculiar to itself and these bacteria have the power of abstracting the free nitrogen from the air and converting it into nitrates which can then be used by the plant. On the roots of the plant are small tubercles, the bacteria form these tubercles, and they serve as a reservoir or storehouse for the nitrogen. It must be remembered that there is a special kind of bacteria for each legume. However, the bacteria for sweet clover and alfalfa are just the same. The soil can be inoculated in several ways. One method consists in covering the whole surface of the soil to be seeded with a slight covering of stable manure. This manure contains the necessary bacteria and this plan has proved satisfactory. Probably the best method consists in sprinkling some of the infected soil from an old alfalfa field over the field to be seeded. This last method would seem the most desirable because it could be carried out with no cost and not a great amount of labor.

It is thought that the bacteria are seriously affected by the hot sun, so it is very essential that the ground should be promptly harrowed upon their introduction into the soil.

Alfalfa needs much lime, potash, phosphoric acid and magnesium, but it feeds to the greatest degree on lime. For this reason alfaifa almost invariably does well on limestone soils. The soil should be well drained so that the water will not stand long on the plants. An excess of water drowns the plants and causes the roots to decay. In a sandy soil, no artificial drainage is needed.

The ground should be plowed deep in order to give the roots of the young plant a good chance to start. By rolling, the plowed ground can be packed and will then hold the moisture much better. Then it is a good plan to harrow the ground with a light harrow for the purpose of loosening the surface soil to a depth of one or two inches. The ground should by all means be worked into a fine condition so that the seed can come in direct contact with the fine particles of soil.

In regions where the soil is exposed to the wind and blown off the higher places, a sowed crop should be grown the preceding year so that the ground will be covered by a stubble. This stubble will prevent the soil from blowing away and will also help materially in retaining the moisture. The surface soil should be fertile so that the young plants can make a quick and early start

and be able to withstand the frost or wet weather which might possibly occur.

The seed can be drilled in or sown broadcast. If it is drilled in, about 18 pounds per acre will be sufficient under ordinary circumstances. But if it is sowed broadcast, about 20 to 25 pounds per acre should be used. By drilling, a more even stand is secured. When sown broadcast the seed should be merely covered by using a light harrow.

If a hay crop is desired, the seed should be sown so that the plants will be close together and the stems small and soft. If a seed crop is desired, the plants should be farther apart so that there will be room for the flowers and afterwards the seed. The seed should at least be sown thick enough so that the weeds and grasses cannot gain a foothold and choke out the young plants. For this reason, a nurse crop sown with the alfalfa will help to keep the weeds down and enable the young alfalfa plants to secure a good start.

In the North the seed should be sown in the spring as soon as all danger of heavy frosts are past. Fall seeding can be employed to advantage in the South as the winters are mild. By using this method the weeds are not so troublesome.

After the plants are about three inches high it is a good plan to clip them with a mower and repeat this about every six weeks during the first summer. This prevents the quick-growing weeds from going to seed and enables the young alfalfa stem to become stronger.

RAILROAD TIES OF LOBLOLLY PINE.

PRESS BULLETIN 69, UNITED STATES DEPARTMENT OF AGRICULTURE.

A good example of what is being done along the most practical lines by the Bureau of Forestry of the U. S. Department of Agriculture, or the Forest Service as its designation will become on July 1, 1905, is furnished by the results of a study of loblolly pine in east Texas which it has recently made. Vast quantities of loblolly pine exist in the Southern States, some of which is sold on the market as shortleaf yellow pine. The wood of loblolly pine is inferior to that of longleaf and of shortleaf pine, partly because of the rapidity with which it decays when exposed to the weather or in contact with the soil, but for many purposes it answers just as well as the more valuable species. It is certain to increase greatly in commercial value and its use is now extending rapidly. As the longleaf and shortleaf pines become scarcer and higher in price loblolly is sure to replace them to a great extent; this study of its uses is therefore very timely.

One of the chief purposes for which loblolly is now used in the Gulf States is for railroad ties. The wood is not durable and the tie in its natural state is short-lived, but by preservative treatment it can be made to resist decay for a number of years. The discovery that treated loblolly pine is an excellent substitute for longleaf for railroad ties is greatly to the benefit of the railroads since it enables them to use a less expensive tie. It also benefits the country at large by cutting off one of the heavy demands made upon the longleaf forests and thereby setting free a corresponding amount of that material for the general market.

In making loblolly pine ties there are many wastes and the drain upon the ex-

isting forests is greater than it need be. The recent study was therefore made for the purpose of showing the rate of growth of the trees, and how ties could be produced more economically.

Loblolly pine is found in commercial quantities in ten counties of east Texas, where it covers an area of nearly 2,880,000 acres, and is hewn into cross-ties on a larger scale than in any other State. The magnitude of this industry results from an abundant supply of loblolly pine of sizes just suited for pole ties. It is estimated that from 75 to 80 per cent. of the present loblolly stand in Texas is timber of tie size, the remainder being large enough for lumber. The preponderance of comparatively young and small timber is due principally to severe storms in 1865 and 1873 which overthrew the old pine on many thousands of acres and established new stands of young trees.

Loblolly is adapted to a wider range of soils than any other pine in east Texas. This, with its frequent and prolific seeding, its rapid rate of growth, and its immunity from hogs which eat the roots of the young longleaf pine, enable loblolly pine to reproduce readily on denuded land. In many situations it competes successfully with longleaf pine and comes up under hardwoods if the stand is not too dense, and rapidly outgrows them. The conditions in east Texas are most favorable to this species; it is sure to increase in commercial importance and may become the principal source of timber supply of the region.

Three counties in east Texas—Orange ,Jasper, and Newton—furnish annually from 1,000,000 to 1,500,000 hewn loblolly pine ties. The trees cut for ties vary in size from 11 to 17 inches in diameter, measured breasthigh. The hewers prefer diameters of 12, 13, and 14 inches as the smaller the tree, above tie specifications, the less the labor in squaring it. The largest number taken are 13 inches in diameter. This practice is very wasteful, for the average tree 11 inches in diameter is about 35 years old and is growing rapidly. The average yearly increase in value between 11 and 13 inches is over 7 per cent., and from 13 to 14 inches 5.5 per cent. After the latter size is reached growth falls off so fast that for the next inch of growth the increase averages only 2.5 per cent., and at 16 inches the value for hewn ties ceases to increase.

These facts point out the rule which the owner should followin selling trees for ties. Those 11, 12, and 13 inches in diameter are growing so rapidly both in size and value that to cut them consumes the capital that is bringing him the best rate of interest. The tie maker should be confined to 14, 15, and 16-inch diameters. Trees above 16 inches should be preserved until they can be profitably felled for lumber.

The adoption of this rule will be best for the owner and for the productive future of the forest as well. It will, however, necessitate a complete change in the method of getting out ties as they will have to be sawed instead of hewed. But this too would be a gain for both owner and forest, since hewing is a very wasteful method of tie production. Under it many of the larger trees are cut with unnecessearily high stumps in order to save labor in hewing down the butts. In many other cases the trees are not used as far up into the tops as they might be. Further, the hewing process itself is very wasteful and leaves in the woods a quantity of litter in the shape of slabs and chips in which fire is often started and the forest seriously damaged.

If hewing is continued it would be unwise to restrict the cutting to 14, 15, and 16-inch trees for that would involve in-

creased waste, but the value of the smaller sizes demands this restriction and sawing should take the place of hewing. When the larger logs are sawed several boards can be obtained from the wood now wasted in slabs and chips as the hewing progresses.

There is still another form of waste resulting from hewing. In grading ties the railroads are very strict about accepting none under specification sizes, but they do not object to some excess in size. This, and the fact that less labor is required to produce large ties, has induced hewers to make many ties larger than they need be. This is a small matter in the case of each tie, but as they are cut by the million the excess represents in the total a very large waste of wood. It means also an unnecessarily great consumption of creosote or other material used in the preservative treatment, since the total bulk of wood which must be treated is greater.

It is estimated that from 48 to 70 per cent. of the timber cut for pole ties goes into chips, slaps, and excess over the maximum dimensions required. Adding all causes of waste it is found that the percentage of timber actually used in hewn ties is no more than from 25 to 30 per cent. of the total volume of the trees felled.

Loblolly pine grows so rapidly that two crops of pole ties can be produced in less time than is required to grow one crop of longleaf pine ties, and from each of the two crops there will be a larger average yield of ties. This tremendous advantage of loblolly pine is increased by the marked ability of the tree to reproduce itself. Conditions in east Texas are almost ideal for the maintenance of forests of this tree, and the opportunity to earn good returns by their conservative management is equalled in few parts of the country.

General Agricultural News.

The proceedings of the American Forest Congress, held at Washington, D. C., January 2 to 6, 1905, under the auspices of the American Forestry Association, was issued in book form on March 15. The volume contains about 400 pages, and is bound in cloth. It contains the complete addresses by President Roosevelt, Secretary Wilson and fifty other speakers who were on the program, including not only those prominent in state and national forest work, but the leaders in the railroad, lumbering, mining, grazing and irrigation industries. It is published for the American Forestry Association by the H. M. Suter Publishing Company, Washington, D. C.

* * *

It is reported that as the result of recent trouble at the Massachusetts Agricultural College the Senior class voted to withdraw from college. A short time ago thirty members of the class were declared guilty of ungentlemanly conduct in the class-room. The faculty ordered the class to make a public apology to the college and to the professor in whose room the disturbance took place. Three of the Seniors were suspended for one year. The members of the class objected to the suspensions, claiming that all were equally guilty and decided to walk out.

* * *

Mr. Thorne M. Carpenter has resigned his position as assistant chemist and assistant in the investigations with the respiration calorimeter of the Agricultural Station of the Pennsylvania State College to accept a similar position in connection with the investigation on human nutrition at Wesleyan University. The vacancy has been filled by the promotion of N. C. Hammer, and W. A.

Smith, a graduate of the college in 1901, has been appointed assistant chemist.

* * *

A short but very complete circular has been issued by the Cornell Experiment Station dealing with bovine tuberculosis. It is by Dr. V. A. Moore of the New York State Veterinary College, and is simply a plain and popular account of the disease for the general information of the public. It should be read by all who are interested in cattle growing and may be obtained on application, for Bulletin No. 225, to L. H. Bailey, Director Experiment Station, Ithaca, N. Y.

University News.

At the recent meeting of the Board of University Trustees, Dr. Carl W. Gay, of Ames, Iowa, was appointed assistant professor in Animal Husbandry, succeeding H. S. Arkell, resigned. Supt. A. B. Graham, of Springfield, was appointed superintendent of the rural extension work, with E. S. Guthrie, of the Dairy Department, as his assistant. This latter work is to be taken up rather extensively during the coming year in an effort to bring the rural districts in touch with the university.

Catalogues have just been issued announcing the summer term, which is to be given at Ohio State this year. This is the first attempt at a summer term and bids fair to be a success. The catalogues are of interest to any one seeking a thorough summer school.

Instruction will be given in the departments of American History, Botany, Chemistry, Education, English, German, Spanish, Latin, English, Manual Training, Mathematics, Physics, Physiology and Physical Geography. Besides the work in these departments, other courses will be offered in Bacteriology, Calculus, Civil Engineering, French, Pathological Anatomy and Histology, Shop Work and Technical drawing. A course of lectures, by eminent men from various institutions throughout the country has been arranged. These lectures are to be given daily, and promise to be one of the strong features of the term.

One of the chief purposes of the course is to bring the high schools of Ohio in touch with the university, thus a complete review of high school work is to be offered.

The athletic season ticket scheme is again meeting with success, almost 700 tickets being taken on the opening days of school. Holders of the tickets are entitled to the wearing of the new athletic button, which is in the form of a scarlet "O" on a gray back ground.

This season's base ball team looks fairly strong, but some of the old men are missed, especially Jackson and Gould when it comes to "hitting the ball." Several good men are barred because of the faculty rules concerning college work. In the games thus far a good showing has been made. Following are the scores:

April 6—Ohio State 4, Columbus Senators 7.

April 8—Ohio State 7, East High School 3.

April 15—Ohio State 5, Muskingum 1.

April 19—Ohio State 21, Otterbein 9.

Mr. Joseph E. Wing, of Mechanicsburg, on April 12, gave a very interesting address before the Agricultural Society on "Silage and Silo Construction." The Agricultural Society is to be complimented for the strong speakers which

it has presented to its student audiences during the past year.

The university has recently been given a collection of wools, representing the classification of wools in the Boston market. The gift was from Benedict & Dickinson, of Boston, and will be valuable for use of classes in Animal Husbandry.

Alumni Notes.

Mr. T. L. Wheeler, '05, has resigned his position in the Bureau of Soils, and accepted that of editor of farm department, on the Daily Drover's Journal, Chicago.

C. C. Poindexter, '03, now occupies a position at the Institute for Colored Youths, located at Cheyney, Pa. He is teaching Nature Study and Chemistry. He is also Director of the Departmet of Agriculture.

Three of our alumni are holding professorships in the New Hampshire Agricultural College at Durham, N. H. Frank W. Rane is Professor of Horticulture and Eorestry; E. L. Shaw, '02, is Assistant Professor of Agriculture and Assistant Agriculturist of the Experiment Station; F. W. Taylor, '00, is Professor of Agriculture and Agriculturist of the Experiment Station.

S. J. Tyler, '00, is assistant in the office of Fibre Plant Investigations, U. S. Department of Agriculture.

S. D. Twitchell, '03, is very pleasantly located as manager of a fruit farm near Mansfield. He records good success and a bright future.

H. L. Osborn, ex-'03, is successfully engaged in farming near Chardon.

Dairy Notes.

At the April meeting of the Board of Trustees of the Ohio State University, the Department of Agriculture was divided into four departments as follows: Department of Rural Economics, in charge of Prof. Price; Agronomy, in charge of Prof McCall; Animal Husbandry, in charge of Prof. Plumb, and Dairying, in charge of Prof. Decker.

Mr. E. S. Guthrie, who was in charge of the creamery laboratory during the dairy school term was elected instructor in butter making and will assume his duties September 1 at the Ohio State Fair, where the University will operate a working dairy.

Location of some of the members of the last dairy class:

Chas. Ault will work with his father on a dairy farm at Linden, Pa.

R. F. Armstrong is working on a farm at Clintonville, O.

Miss Olivia Cleveland will manage a 200-acre farm in Kentucky not far fram Cincinnati.

H. O. Jansen will work in the Huencke creamery at New Bremen, O.

William H. Paxton and R. J. Naugle are operating the Windsor, Ohio, creamery for the McJunkin-Straight Dairy Co., of Pittsburg.

J. B. Nash is teaching school near Alliance, Ohio.

C. S. Neer is on a dairy farm near Mechanicsburg, O.

Orris Newcomb has engaged with a sanitary milk establishment near Cleveland.

Herbert F. Parrish is making butter at Newark, O.

T. L. Pulsifer is operating a skimming station for A. M. Carr, six miles from Salem, O.

Howard Smith has a position on a farm at Workman, O.

J. W. Sutton has engaged to operate the Muskingum Elgin creamery near Zanesville, O.

Q. A. Underhill will assist his father in the creamery at Lester, O.

M. J. Walton is working on his own dairy farm at Bedford, O.

P. H. Wetmore is working on his home farm at Canfield, Mahoning county, O.

D. E. Child is working for the Findlay Dairy Co.

Mrs. Groce and Miss Francis Johnare employed on the Youmans farm near Worthington, O.

W. E. Cline is manager of Prof, Price's farm at Newark, O.

F. P. Mills will engage in the creamery business in Union county.

Maynard Wolcott has engaged to operate a sanitary dairy at Troy, O.

T. L. Bates is operating a creamery for the Smith Creamery Co., at Ridgeville, Lorain county.

Ernst Hackman, Theron Rose and R. J. Perkins, the only remaining members of the class, have offers of positions under consideration.

Book Review.

THE POTATO—Its Cultivation, Growth, and Development, Sprays and Spraying, Harvesting and Storing, Production, Transportation and Marketing. By Samuel Fraser, Assistant Agronomist, Cornell University.

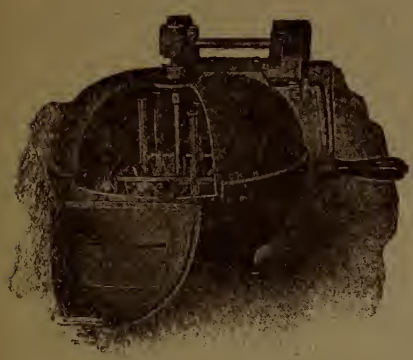
This book is destined to rank as a standard work upon Potato Culture. While the practical side has been emphasized the scientific part has not been neglected, and the information given is of value both to the grower and the student. In the preparation of this work the author has drawn largely upon the reports and bulletins furnished by the American Agricultural Experiment Stations during the past fifteen years and upon any European data which he has felt to be of sufficient value to warrant their introduction.

Treating upon its history and botany, some conditions influencing growth and development, soils, rotations, manuring and fertilizing, considerations of seed, varieties, planting, cultivation, obstructions to growth and development, sprays and spraying, harvesting and storing, production, transportation and markets, chemical composition, breeding and selecting, the life history and methods of controlling many of the diseases and insects which attack potatoes are given.

The book is well illustrated by photographs and drawings, nearly all of which were made expressly for this book by the author. Taken all in all it is the most complete, reliable and authoritative book on the potato ever published in America. Illustrated, 5x7 inches, 200 pages, price , postpaid, 75c. Orange Judd Company, 52 Lafayette Place, New York, N. Y.; Marquette Building, Chicago, Ill.

"RUNS LIKE A TOP"

The Twentieth Century Babcock Tester.



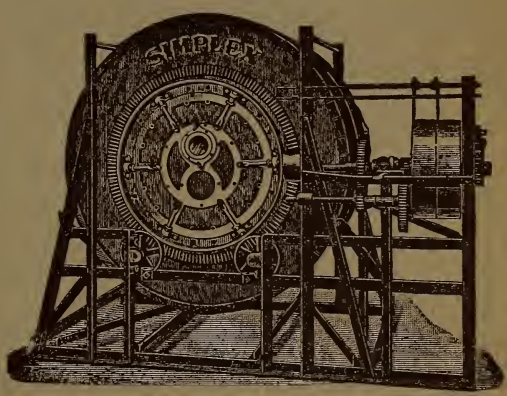
Gearing all at the top of machine and enclosed in case. Runs with the utmost ease. A speed of 1000 revolutions per minute can easily be reached. Just as accurate results can be obtained as from use of large Turbine machine.

Creamery Package Mfg. Co.

CHICAGO, ILL.

TWO OF OUR SPECIALTIES

"SIMPLEX" Link-Blade Cream Separator.



"SIMPLEX" Combined Churn and Butter Worker.

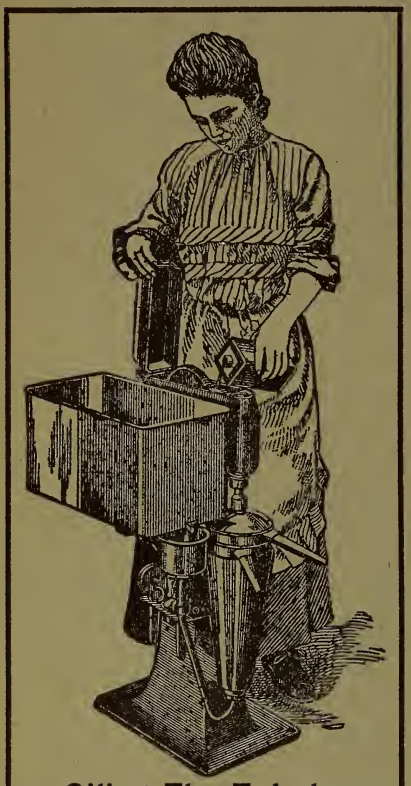
We manufacture other specialties for use in creameries, cheese factories and dairies; "SIMPLEX" Regenerative Pasteurizer, "B. & W." Heaters; Check Pumps and Steel Vats; "FACILE" Babcock Milk Testers; Sprague Continuous Pressure Adjustable Cheese Presses, &c.

Send for our general illustrated catalogue.

D. H. BURRELL & CO., Little Falls, N. Y.

Why Water Don't Run Up Hill

Some folks say gravity makes water flow down hill—which is just another way of saying it's mighty up hill work for it to flow any other way.



Oiling The Tubular

And it's just as up hill work to turn improperly oiled separators. The oiling should be so perfect that the running parts turn as easily as water runs down hill. Turning a poorly oiled separator is mighty up hill work, equally wearing on the machine and the man at the crank. **Perfect lubrication is found only in Tubulars. The illustration shows it clearly.**

Notice the absolutely simple, yet perfectly scientific, automatic oiling device on hand driven Tubulars. Gear wheels and ball bearing are all enclosed, yet instantly reached simply by lifting the gear case cap. You pour a spoonful of oil into the gear case once or twice a week, and let the machine do the rest. The lower gear wheel dips into the oil, whips it into a mist and drives it over the wearing parts, lubricating the machine to absolute perfection. It is partly this that enabled a Dairy Tubular to run 50 hours a week for 24 weeks, recently, without requiring adjustment or repairs of any kind and with but three quarts of oil. Consider the perfect lubrication, safety, neatness and durability. Do not these advantages appeal to you? We think they must.

Automatic oiling is but one of the special features found exclusively in Tubulars. Our new Catalog E tells all about the others. Write for it and our handsome 1905 calendar—both free.

THE SHARPLES SEPARATOR CO.

Chicago, Ill. **West Chester, Pa.**